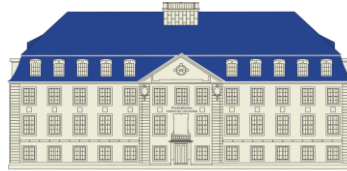




Institut für
Angewandte Physik



Physikalisches
Institut



RHEINISCHE
FRIEDRICH-WILHELMS-
UNIVERSITÄT BONN

COLLOQUIUM „OPTICS AND CONDENSED MATTER“

Michael Fleischauer

Technische Universität Kaiserslautern, Germany

Nonlinear excitation transport in Rydberg arrays: Quantum gauge fields and topological spin liquids

Recent experiments have demonstrated that spin-orbit coupling can give rise to density-dependent Peierls phases associated with the transport of Rydberg spin excitations in atom arrays [1]. This nonlinear hopping provides a natural way for the implementation of a variety of non-trivial spin systems ranging from topological lattice models to lattice gauge theories, anyon physics and spin liquids. Two specific models will be discussed in more detail, a one-dimensional zig-zag ladder and a two-dimensional honeycomb lattice. Here the competition between density-density interaction, linear and nonlinear transport and frustration gives rise to a variety of interesting phenomena ranging from emerging quantum gauge fields in a zig-zag lattice to topological, chiral spin liquids in a honeycomb lattice.

[1] V. Lienhard, et al. Phys. Rev. X 10, 021031 (2020)

November 15th, starting live with coffee 16:45 h, talk at 17:15 h, live IAP lecture hall/via Zoom

<https://uni-bonn.zoom.us/j/98441612025?pwd=a01SSjlkY1Q3SDFhL09JQk1qc1V6dz09>

Meeting-ID: 984 4161 2025

Kenncode: 294164